

AMATEUR RADIO



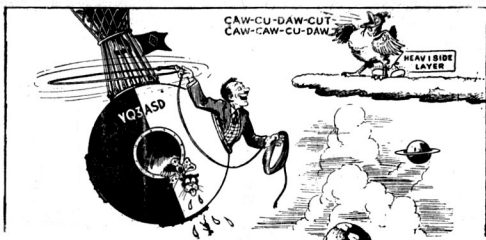
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AMATEUR RADIO

Published by the Wireless Institute of Aust., Victorian Division.

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1st December, 1934

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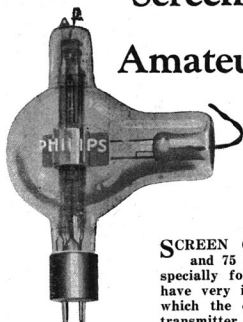
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Screen Grid Valves

For

Amateur Transmitters



Types:
QB2/75, QC05/15

quarter of actual size

SCREEN GRID Transmitting Valves for 15 and 75 watts have been designed by Philips specially for use by amateurs. These valves have very important properties, as a result of which the construction and adjustment of the transmitter can be greatly simplified. The control-grid and anode of these valves are screened from each other by a screen-grid, thus reducing anode-control grid capacity to a minimum. When used as H.F. amplifier or frequency multiplier in controlled transmitters there is practically no reaction of the anode circuit on the grid circuit, and self-oscillation is impossible with screening outside the valve. Neutralisation is unnecessary, so it is very easy to alter the wave-length at short notice. These screen-grid valves give greater amplification than triodes under the same conditions.

Table A shows the various electrical properties of the Philips amateur transmitting valves:—

CHARACTERISTICS:

Table A.
Type.

Screen Grid Valves		
	QC 05/15.	QB 2/75
Filament Voltage	4.0	10.0
Filament current*	1	3.25
Saturation current*	400	2,000
Anode voltage	400-500	2,000
Screen grid voltage	75-125	300-500
Max. anode dissipation	15	75
Anode dissipation on test	20	100
Max. screen grid dissipation	3	15
Amplification factor*	225	200
Mutual conductance (slope)*	1.4	1.4
Int. resistance*	160,000	150,000
Anode-grid capacity	.001	.02
Max. diam. of bulb	50	100
Max length	160	210

*Approximate values.

PHILIPS

TRANSMITTING VALVES



Editorial

W.I.A. Thanks the World

The thrills and spills of life that we read about could not have been exceeded during those four happy week-ends in October when the W.I.A. placed itself in the fields of international radio contests. We have achieved a big ambition—that is, of putting the W.I.A. on the map. Could any other scheme have placed before the modern ham throughout the world the enthusiasm and activity of us hams down "South"? We say "modern," because not only is the Institute the oldest radio society in the world, but, during the earlier history of international contacts, Australian hams did their share of pioneer work. Those of us who can take our minds back to the days of A2CM, A3BQ, and others who were active in those days, are in a position to realise that the A's of yesteryear set the pace for the VK's of to-day, and made a reputation to be upheld. In the hustle and bustle of life, we set out to place our Continent before the eyes of the world in the merry month of October. Did we succeed? Well, who was the bird that said: "It appeared that every station in the world was on during the contest!" The response to our call to the amateur world was only too well answered, and we can proudly say that the Centenary DX Contest was a tremendous success. In acknowledging the co-operation we received we must offer our heartfelt thanks to our brother societies, contemporary magazines, and to the amateur fraternity the world over. They, and our trophy donors, made the show what it was. We thank you all!

Now 1935!

Christmas will be on us again in a few days, it seems, and that must be followed, as usual, by a New Year. What has 1935 in store for us? Nobody knows what will turn up, but what have we in store for 1935 would be a better question. Look-

ing back over 1934 we have had an international contest, a vast increase of membership, and some experimental work done. We must do better than that next year. Our old friend "Depression" has vanished, and, with the W.I.A. in a wonderfully good position, it is our golden opportunity to become wildly active, and keep on the top rung of the ladder. If we set our minds on a definite aim and object; formulate a one-year plan if you like; we then have something to strive for. The W.I.A. can do its share, and the hams theirs. Our primary object is a 100 per cent. Institute membership throughout Australia. At the present time the W.I.A. is offering more than many members think, but it is going to offer more next year. Surely it is time that amateur radio regulations were reconsidered and brought into line with modern-day practices? With a strongly united body like our W.I.A., we are in a position to speak for the Australian amateur; but wouldn't our weight be much greater if we could speak for 100 per cent. of the licensees? If he wants the air cleared of self-excited signals, poor operating, unnecessary QRM, and all the other bugbears that go to make amateur radio unpleasant, a ham MUST wear the badge of the W.I.A. The advantages and privileges of membership speak for themselves, but, to add to these, we certainly hope that the 1935 Federal Convention in Hobart will produce bigger and better results. If this be so, we will be in a position to go to the P.M.G.'s department with recommendations for the modernising of the regulations. We use the "regs.," and there is no reason in the world why we cannot make suggestions of additional and amended regulations for the betterment of amateur radio. That is part of OUR plan for 1935; YOUR part is to get the outsider into the fold, because united we stand and divided we may be "knocked back"!

The Mysterious Angle of Radiation

(By courtesy of Westinghouse Electric and Manufacturing Co., through Alan S. Duke Pty. Ltd.)

The amateur has been troubled with many veiled references to the Angle of Elevation of Radiation. He carefully looks over the towering antenna arrays of the commercial radio companies but finds little evidence of any attempt to govern that angle. In fact, all the systems appear to radiate a beam parallel to the earth's surface. He does find, however, an occasional broadcast station using an elaborate system to "cut out the ground wave," and has heard of "landing an aeroplane down an inclined beam." He found out long ago that even if surrounding obstructions did affect his signals in certain directions, as long as there was a bit of clear sky overhead, he was sure to be heard by someone. When he considers the various angles at which the amateur will extend his antenna system, and then listens to their signals, he concludes that all amateurs are capable of sending out "cork-screw" waves that literally "bore" themselves through the ether to the four corners of the earth. He finds one commercial using a "wave" type for transmitting, hung in a vertical plane, and then discovers that the same type of antenna, when used for receiving by this company, is hung in a horizontal plane. There must be some reason for these seemingly arbitrary practices, and a little investigation of what is supposed to happen will not be out of order.

An antenna, either vertical or horizontal, located above the earth's surface is greatly influenced by the earth below. That portion of the power radiated in a direction below the horizontal, is partly absorbed and partly reflected, depending upon the effectiveness of the earth as a reflector. The portion reflected re-enforces the power radiated above the horizontal, and the field pattern in a vertical plane shows stronger radiation at some angle slightly above the horizontal. If the angle is quite definite and well above the horizontal,

the ground wave will be small and the antenna is said to radiate at high angles. The supposition is that when the beam is reflected by the Heaviside Layer, it will again strike the earth at a point much closer to the antenna than a beam directed in the horizontal plane. This is true, but consideration must be given to other factors affecting the beam. The beam appears to follow somewhat the curvature of the earth and does not travel in a straight path. Again, when it strikes the Heaviside Layer it may suffer refraction, and be reflected in a path that misses the earth. This seems to be the case of the extremely high frequencies—30 to 60 megacycles. Or it may penetrate the Heaviside Layer and be lost in Cosmic Space.

It might be well, for the benefit of those who are newcomers to amateur radio, to give a short explanation here of the make up of the Heaviside Layer, and its action upon high frequency waves. A theory which seems well borne out by the results of experiments and much data is that the Heaviside Layer consists of two separate ionized strata, the lower of which is almost 100 miles above the earth's surface, and the other about twice this distance. These distances vary with the coming of darkness or daylight, that of the lower layer changing more rapidly than the one above.

The lower layer seems to have the property of reacting in various ways to waves of different lengths. Very long waves, above the broadcast band, are reflected almost perfectly by the lower strata. Intermediate waves which take in the group from 150 to 400 meters, are largely absorbed by the lower strata, thus indicating that those rays which are reflected, and those which pass through the lower, and are reflected by the upper, strata, will give interference, resulting in the well-known fading characteristic and distortion.

Short waves, however, seem to pass through the lower layer easily, are bent somewhat by it, and are reflected by the outer layer, coming back to earth if the reflecting angle is not so great that the earth is missed entirely.

Thus we see that, in the case of a directed transmission of short

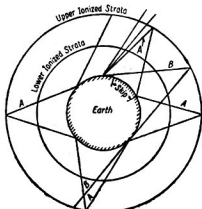


FIG. 1—APPARENT IRREGULARITIES IN REFLECTION OF A RAY CAUSED BY ATTENUATION OR OVERPENETRATION OF IONIZATION IN HEAVY LAYER.

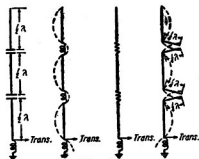


Fig. 2.

waves, the angle of elevation must not be too high, or the rays will shoot directly through both layers. It must not be too low, either, or the angle made by it with the outer strata will be so small that the reflected wave will miss the earth. An angle between 3 and 15 degrees seems to be about right for long distance communication.

Ultra short waves, 10 meters and shorter, seem to poke right through both layers, as a rule. There have been some cases of long distance contacts with these waves, but they seem to be only of short duration, and therefore are the result of freakish conditions in the reflecting layers. It is in this field that the greatest possibilities lie for the amateur to prove again that he can put so-called useless parts of the radio spectrum to work, as he did with the short waves.

Fig. 1 gives an elementary diagram showing a hypothetical conception of the Heavyside Layer, and its probable result upon short waves. The two rays, A and B, are the probable boundaries for the useful rays for long-distance communication. Between these angles, all rays are reflected, and give a blanket effect. Interference between rays reflected from different angles, with different bendings and changes in polarization, due to the passage through, or reflection from, ionized strata, cause fading, and the various peculiarities of received signals, with which short wave fans are familiar.

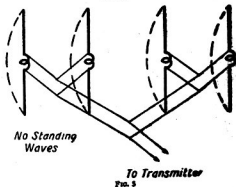
Experiments seem to indicate that a vertically polarized wave rotates, and will eventually show up as a horizontally-polarized wave. This effect is quite noticeable with frequencies around 56 mega-cycles.



To Transmitter
FIG. 3

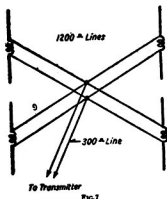


To Transmitter
FIG. 4



The amateur receiving such signals often finds that the rotation of his receiving antenna from the vertical to a horizontal plane will cause considerable increase in signal strength. 56 mega-cycle waves often change planes when passing through obstructions such as buildings, the change sometimes taking place within a few feet.

Polarization is a term which has many meanings as applied to light, storage batteries, etc. When applied to radio emanations, it refers to the direction of the magnetic induction. Any radiation of radio frequency produces waves which have a magnetic induction only in one direction, de-



pending upon the shape and location of the radiator. At right angles to the plane of the electro magnetic field is an electric field, and it is the position of this electric field with reference to the plane of the earth that determines whether the wave is considered as horizontally or vertically polarized.

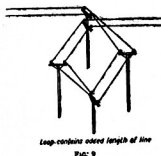
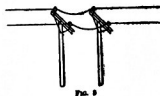
Thus, a horizontal antenna has its magnetic field in a direction perpendicular to the antenna. At right angles to this is the electric field, which is horizontal. So a horizontal antenna radiates a horizontally polarized wave, and a vertical antenna a vertically polarized wave.

Considerable experimentation has taken place both with vertically and horizontally polarized waves. The greatest efforts have been expended upon the vertically polarized waves, because constructional difficulties limit the scope of the horizontal array. German engineers conducted extended experiments with horizon-

tally polarized waves obtained from a stacked antenna within a parabolic reflector mounted in a horizontal plane. They found that radiation angles from 0 to 20 degrees were best. Subsequent tests over long distances at high frequencies have shown that the optimum radiation of horizontally polarized waves is best when the angle is approximately parallel to the earth's surface. This rather depreciates the importance of high angle of radiation so far as horizontally polarized waves are concerned.

The American and the English engineers also conducted experiments on both horizontally and vertically polarized waves. Their conclusions seemed to indicate that the vertically polarized wave was preferable, and their efforts since then have been directed in this direction.

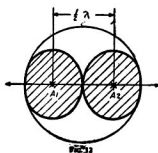
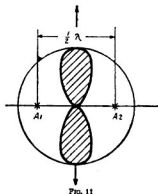
All the foregoing may lead the amateur to believe that he can obtain best results by sticking to an-



tennae that radiate at low angles. This is probably not true, since there has been very little work done with the higher frequencies, 40 to 60 mega-cycles, and the belief prevails that there is some way to overcome the quasi-optical effect at these frequencies: It may be the amateur's

good fortune to stumble upon it.

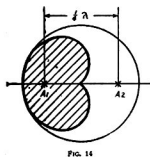
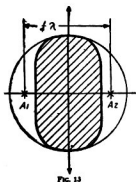
Practically all the large arrays used by the commercial radio companies radiate vertically polarized waves, concentrated in a beam that does not project much above the horizontal path. They have found that concentration of the beam in the vertical plane causes a decided improvement as the frequency in-



creases. This effect is noticeable at 6 megacycles, and is quite decided at 20 megacycles. This is to their advantage, since it allows them to standardize on the height of the structures used. Concentration in the vertical plane is accomplished by "stacking" half-wave elements, one above the other, usually starting with two tiers of elements at 6 megacycles, and running to as high as four tiers at 20 megacycles. The Double Zepp and companion antenna systems comprise two tier systems when operated at twice the designed frequency. These antennae were described in the preceding article. Fig. 2 shows several ways in which half-wave elements may be stacked or arranged in tiers. The phase relation of the current in each element is the same.

Concentration of the beam in the horizontal plane is usually accom-

plished by constructing a row of half-wave elements. Figs. 3, 4, 5 and 6 show several methods of accomplishing this, one being a two tier array. It is customary to erect a reflector system identical to the antenna system, to the rear of the antenna, to cut out the radiation in the undesired direction. This reflector may be parasitic or driven. Fig. 7 shows a symmetrical array, in which each element is fed directly through a transmission line. These lines terminate in the centre, at which point a second line runs to the transmitter. This second line has an impedance equal to one-fourth of the connecting lines. Simply a case of paralleling impedances. If this system is erected on the corners of a square one half wave to the side, and all elements in phase, it produces a clover leaf field in the horizontal plane. In the vertical plane, the field is strongest directly above the array, being about five times the maximum of the horizontal pattern.



For causing slight changes in phase relation in different elements in an array, it is customary to insert small loops in the line. Fig. 8 shows such an installation, the added wire being allowed to sag. For causing

large changes, such as one eighth or one-quarter period, larger loops are inserted in the line. Fig. 9 shows such an installation, the added line being supported on posts, and is usually square or hexagonal form. If a concentric tube type of line is used, it may be lengthened by running it snake fashion or in a sort of sine wave path. Fig. 10 shows this method.

By taking advantage of this way of controlling the phase relation of several antennae, the amateur may erect two similar doublets, one half wave apart, excite them through transmission lines, and, by reversing the line in one antenna feed, cause a 90 degree change in the directional characteristics of those antennae. Or he may erect two doublets one quarter wave apart, and by cutting in enough line to cause it to lag one quarter period, cause the system to change from a bi-directional system to a single direction system, at 90 degrees from the original. By shifting the loop to the other antenna, he did cause a complete reversal or 180 degree change in the single direction. Figs. 11, 12, 13, and 14 show the field patterns for these combinations.

The half wave elements may be constructed from the information given in previous articles.

As has been indicated, polarization of waves on 56 mc. seems to change rapidly, due to the effect of obstructions. A portable receiver with a rotatable antenna can be used to make some experiments on this change of polarization. It will be necessary to equip the receiver with a plate current indicator.

A 56 mc. transmitter can be set up with a vertical antenna and field strength readings taken at intervals, or continuously, in any direction from the antenna. Where dead spots occur, try rotating the receiver antenna into a horizontal position. Increase in field strength indicates that the polarization has become horizontal. Further experiments may be made by rotating the antenna at the transmitter into a horizontal position or to any intermediate position. The maximum field of the horizontal antenna will be perpendicular to the antenna, not off the ends.

Apparently ultra short waves exhibit a rolling or stumbling tendency, because often in open places polariza-

tion will change, probably due to the effect of some obstacle nearer the transmitter.

This field offers unusual possibilities for the amateur, but it will require organized action to produce results. In the early days of radio, experiments were conducted with waves of 15 meters, but because communication could not be maintained over any appreciable distance they were discarded in favor of long waves, where apparently more reliable contacts could be maintained.

What these early experimenters failed to discover was that, after passing the skip distance, the signals again became evident. This was due to three things, (a) closeness of the experimenters to the equipment, for they were working for fixed point to point communication; (b) lack of the presence in other parts of the world of persons interested in the experiments; and (c) relative insensitivity of the receiving equipment.

Amateurs interested in ultra short wave experiments must organize their efforts, to make sure that they are not wasted, as were the early short wave experiments. Work on these waves cannot be handled in the rough manner used on 7 and 14 mc. Directive effects must be handled precisely. Extreme care must be exercised in construction. Angles of elevation and directions must be properly set. Auxiliary transmitters for regular communication between stations co-operating in experiments are essential, to give quickly results of tests and adjustments.

RSGB Christmas Greetings

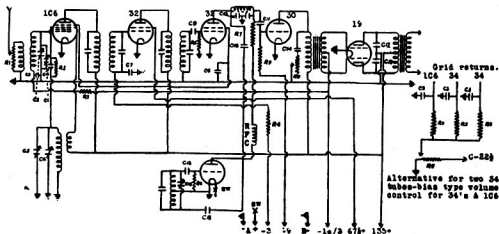
"With the approach of the festive season I wish, on behalf of the council and home members of the RSGB, to extend to you and your colleagues our sincerest good wishes for Christmas and the New Year stop may I express the hope that the friendship which binds the amateur movement together will still further extend and that the cordial relations which have always existed between our two organisations will continue for all time stop signed Arthur Watts, G6UN, President RSGB."

The Countryman's Superhet.

By F. J. Stirk.

Of late we have heard quite a lot about "Single Signal Supers." Now just what are these things? Boiled down, there are straight superhets., using a crystal filter in some cases, and intermediate frequency reaction, to bring up the selectivity, in others. This article was written to cover the description of a small battery superhet. for the country ham who doesn't

then into the 32 second detector. The audio tubes are, of course, the 30 and class B19. The latter tube makes quite a saving in B batteries. If volume can be sacrificed, another intermediate amplifier can be used, and the 1st audio 30 left out. If this suggestion is adopted, 34's are recommended as I.F. amplifiers, and the signal level controlled by a vari-



C1—5 plate.
C2—23 plate.
C3—0.1 mfd.
C4—0.0001 mfd.
C5—5 plate.
C6—23 plate.
C7—0.1 mfd.
C8—0.5 mfd.
C9—0.0001 mfd.
C10—0.00025 mfd.
C11—0.01 mfd.
C12—0.01 mfd.
C13—0.0001 mfd.

C14—0.03 mfd.
C15—13 plate.
C16—0.0001 mfd.
or smaller.
R1—5000 ohm.
potentiometer.
R2—10,000 ohms.
R3—50,000 ohms.
R4—10,000 ohms.
R5—2 megohms.
R6—50,000 ohms.
R7—100,000 ohms.
R8—250,000 ohms.

R9—50,000 ohm.
potentiometer.
C1—25 mmfd.
C2—75-80 mmfd.
C3—100 mmfd.
C4—0.01 mfd.
C5—40 mmfd.
R1—100,000 ohms.
R2—3000 ohms.
R3—50,000 ohms.
R4—100,000 ohms.
R5—100,000 ohms.
C6—50 mmfd.

C7—0.1 mfd.
C8—0.01 mfd.
C9—0.1 mfd.
SW—3 points.
L1—42 turns of 20
DSC on 1 in.
former. Tap 14
turns up.
L2—26 turns of 24
DSC, tap 4 turns
14mc. 12 turns 7
mc.

need signal selectivity. It consists of a straight super., using a pentagrid converter, beat oscillator, and Class B output. The tubes used are as follows:—

1C6 Pentagrid 32, 32, 30, 19, and 30 B/O.

This is not a constructional article, but a descriptive one. The local oscillator, which is combined in the 1C6 (which incidentally is a better tube than the 1A6, the triode portion being very much improved for higher frequencies in the former) is electron coupled to the modulator portion of this tube. The output is fed into a 32 Int. Freq. Amplifier, and

able bias applied to the grids of same.

The best oscillator employs a 30 tube, and is coupled to the second detector output by a very small condenser; a .0001 mfd. is specified, but smaller than that would be O.K. Volume can be controlled, and also, of course, sensitivity, by a 5000 ohm potentiometer across the aerial coil or by varying the bias on the 1A6, or, if 34's, as I.F. amplifiers are used on them. The coil for the beat oscillator can consist of one side of an I.F. Transformer—treat this carefully, and lift one of the turns of the coil about the middle of the coil, and sol-

der the earth wire to it, taking it for granted the winding is a honey-comb wound job. This, of course, tunes to 460 k.c., and the condenser in parallel with the tuning condenser is a midget, for adjustment of the beat note. The I.F. transformers are 460 k.c., and plenty of lift can be obtained if 2 plate trimmers are used on the I.F.'s (some have 3 plate trimmers and some have 2—3 plates have less gain).

A switch is provided in the B/C filament for 'phone reception. If it is decided to use the two audio stages, and only 1 I.F. stage, a jack may be placed in the plate circuit for 'phone, of the 30 audio tube. A speaker that is recommended for this job is an Amplion 01 type Dynamic. It is compact, and altogether very efficient, having a 6 v. field. The coils are standard, and can be wound on formers for plug-in type, or may be put on a long former for switch operation; both are quite good schemes. Suitable lay-outs will suggest themselves to the average ham, and no trouble should be had if everything is carefully shielded. The two 23 plate turning condensers are ganged, and the bands set by them, the band spreading being done by 5 plate midget condensers in parallel with them. The oscillator coils will be found to be the same size as the R.F. coils, because of the low rates of int. freq. to R.F. freq. The 465 k.c. difference will be taken up quite easily by the tuning condensers, so no padding condenser is needed up to about the 3.5 mc. region. Performance should first be checked on the 3.5 mc. band, as it will be found much easier to adjust on the lower frequencies for a start. To line the I.F., a small Hartley Oscillator can be roughly knocked up, unless the B.C.L. set can be used by starting it oscillating on a frequency close to 460 k.c. by putting a small fixed condenser in parallel with the tuning condenser, and final tuning being done by the variable condenser. Coupling should be made to the grid of the I.F. tube first, and when the second I.F. Transformer is lined, the first one can be done, placing the coupling line on the grid of the 1C6. Make sure the triode portion of the 1C6 is oscillating, and then tune in a signal and loosen one of the ganged condensers up and tune for maxi-

mum signal strength. If the condensers vary much, a turn should be taken off one of the coils, and so lined up approx., like that finer tuning done by the 5-plate condensers. The total current drain of the set is approximately 14 or 15 m.a., depending on the strength of the signal on the 19.

A stage of R.F. ahead of the first detector can be used; but the image reception is fairly low on account of the high I.F. Higher int. freq. may be used; but the gain drops off when anything higher than 500 k.c. is used, although experiments have been made with I.F.'s as large as 1500 k.c. The selectivity, of course, also decreases with the higher I.F. Any reports on this receiver would be welcomed by the writer. Please address to 221 Gale Road, Maroubra, Sydney.

LATE 28 M.C. NEWS.

The conditions existing on Sunday, 24th November, were the most encouraging that have been experienced over the past two or three years. VK4BB was the first to get going, and worked 2HZ and 2NO. Shortly before 10 a.m., he worked ZL1BA, who was also heard by VK4XN.

4XN was coming through at R8 in Melbourne, and worked 3WC, 3OF, 3JJ, 6SA, and heard 2NO, 2HZ, and 7KV. 6SA was heard by 2NO, 3OF, and 3JJ, his signals at the latter being very weak, and fading completely at intervals, but 3OF did better and held him for a considerable time; while QSO, 4BB. 3JO, 3WC, 3HK, 3OF, 3JJ, and 6MN also worked 4BB.

2NO heard K6EUQ, and VU2BL reports hearing a VK3 recently, but these were probably harmonics.

The weather in VK2, 4 and 6, was fine, but in Vic., very stormy and unsettled, with a severe thunder storm during the afternoon.

With these conditions during the past 2 seasons, it would have been possible to work the neighboring states from Vic., but no signals from them could be heard. Evidently the skip is lengthening again, and within a year or so, 28 M.C. dx should be again accomplished.

56 Megacycle Transmitters

By P. F. O'Dwyer (VK3OF).

Few amateurs appear to realise the amazing possibilities of the 5 metre band, and of the things that can be accomplished and are being accomplished on it by the few who are at present located there. Undoubtedly, the fear that their receiver and transmitter will not oscillate without a lot of trouble stops many from migrating to this band, but these fears have been proved groundless because this and all other stations at present work-

able being the re-introduction of the super-regen. receiving circuit. These receivers, through super-imposing a signal from a low frequency oscillator on the oscillation of the detector, provide a wonderful increase in sensitivity through the production of an audio beat in the phones. Signals that were R2/1 on the detector and audio increasing to R8 on plugging in the quenching valve in the low frequency circuit.

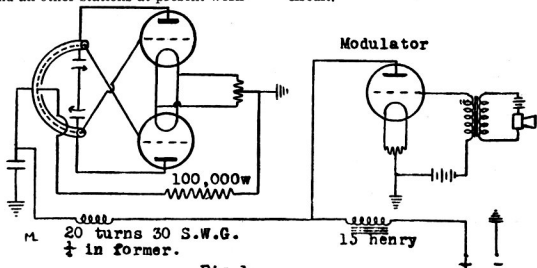


Fig 1.

ing there have found the construction of 5 metre gear to be more than easy. The first investigations on 5 metres in Victoria were carried out by M. S. Israel (VK3ZN) during 1925. His efforts resulted in a contact with VK3BQ during 1926. Interest faded for a while, but peaked up again in 1931, resulting in good work being done and inter-station QSO's between VK3PA, 3GO, 3WL, 3BQ, 3TA and 3JJ. The first outstanding work on 5 metres had been the QSO between VK3JJ and VK3BQ in November, 1931. VK3JJ signals were reported from a number of places, while harmonics from 10 metres were heard for several weeks. And these results were obtained with a series tuned ultra-audion for the transmitter, and straight detector and audio receivers.

Since then vast improvements have been made both in the design of transmitters and receivers, the most not-

These receivers have proved themselves the best yet for phone work, giving exceptional results. When oscillating, these receivers produce an R max. mush or continuous hiss in the phone (the audio beat). When an unmodulated carrier is tuned in, if it is strong, absolutely nothing will be heard, while, if it is weak, a considerable decrease in the noise level of the hiss takes place. When the carrier is modulated by phone, the voice stands out with remarkable clarity.

Similarly, in the transmitters more stable circuits have been designed; the T.N.T. especially proving itself adaptable, whilst excellent results have been obtained with the unity-couple, ultra audion and others.

The signals from these transmitters may be modulated in several ways. For phone work the Heising system gives excellent results, being used at VK3OF most of the time.

The construction of a unity-couple push-pull transmitter does not present any great difficulties, and could be constructed by any ham. At VK3OF such a rig works exceedingly well, giving great output on low power.

In the construction of such a unit, proceed as follows: Take an old 49 plate variable condenser and break it down into two sections of 4 fixed and 3 movable plates, all plates being double spaced. The rotor plates are mounted on the common spindle, but the stator sections are insulated from one another by cutting out a section of the mounting support and substituting pieces of bakelite rod. A single turn of quarter-inch copper tube, 3 inch diameter, is bent to connect direct to the stator end and the plates of the valves. To provide the voltage centre tap a hole was bored in the middle of the plate coil, a length of bent copper tube soldered on, and then cut flush with and pushed through a hole in the baseboard. The hole is between the two valve sockets located at the side of the tuning condenser.

Two lengths of insulated flex are pushed through the plate coil from each end, and threaded down through the plate voltage centre-tap, out through the baseboard, and connected together to one end of the grid leak. The other side of grid leak to the filament centre-tap. The ends of the grid coil cross over one another to connect to the opposite grids.

The plate centre-tap is connected through a by-pass condenser to the centre-tap. This by-pass is not always necessary and its absence from the rig at VK3OF results in an increased output. The high tension supply is connected through a R.F.C. to the plate voltage centre-tap. A single turn of copper tube is mounted close to the plate coil to act as the antenna coupling coil. Power, filament and C.T. terminals are brought to a strip at the end of the set.

The modulator is a compact, simple lay-out and should not present any difficulties, comprising of only the microphone, microphone battery and microphone transformer, bias battery, modulator valve and choke coil. These are connected up as in Fig. 2, all leads being brought out to a terminal strip on the side of the side of the set,

adjacent to the transmitter. This considerably simplifies the wiring of the power and filament supply. When constructed, if you have had no previous phone experience, try it on the higher bands first, and adjust it to its point of maximum efficiency. Then shift it down to 5 metres.

Different antenna systems may be tried, the one giving best results here being the usual 40 metre antenna, 66 ft. top and 50 ft. feeders, tuned with an 11-plate midget variable condenser. Another method is to connect one side of the antenna to the coupling coil, and on the other side connect a 4 ft. length of wire. Then cut this side till the resonance point is found, or two 4 ft. lengths of wire may be used each side of the coil.

The Pickard type of antenna has been tried here and appears to give excellent results. It comprises an impedance matching transformer connected to two lengths of wire, each 43 in. long. To construct the transformer, take some heavy gauge insulated wire. Commence with $\frac{1}{2}$ in. diameter, and wind at flat spiral of three turns, then take a tap off it. Now wind inwards another three turns, and take another tap off. Now wind outwards again another three turns, again taking off a tap. Connect the two inner taps to the two antenna pieces, and connect the feeders, which may be any length and spaced 2 in. apart, to the two outside taps (see fig. 3). Tie the windings together with string, to keep them firm.

With this rig built, no difficulty should be had in raising another station, even though several miles away. Outdoor or unscreened antennas give by far the best results, although VK3JJ, 3JX and 3OF all have fine QSO's, using indoor aerials.

To show the ease with which transmitters work on this band, most of the work at VK3OF is performed with two totally dissimilar tubes in push pull, namely at UX210 and a UX250. The output with 400 volts on the plate is enough to blow pea-globes in the big antenna, and 6-volt globes in the other systems.

This band is not deserted. VK3JJ, VK3JX and VK3OF are constantly on, using both phone and I.C.W. 3KN, 3RS, 3NQ and 3WG are putting in some excellent work, while 3UJ, 3NY, 3AS and 3ZW are constructing their

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gear. It is a revelation to the uninitiated the ease with which phone comes through, the lack of QRM, and the good fellowship that prevails.

This station, VK3OF, is open for sked any time and any requests for advice or for help in locating this band will be welcomed. Become an experimenter and live up to your ticket, and feel the pleasure of having tried something and, above all, of having accomplished something. Well, come, follow us, and feel the greatest of all thrills—that of local DX on 56 megs. Now that the summer is just around the corner, this is the time to start construction.

Radio Personalities

MR. ARTHUR J. VEAL

Mr. Arthur J. Veall has just returned from a visit overseas, and reports that rapid strides have been made in connection with television broadcasting.

He also purchased numerous electrical toys, and states that at least 75 per cent. of the American youth of to-day is educated in the use of electricity.

ALAN S. DUKE PTY. LTD.

The Westinghouse Electric & Manufacturing Co. claim that they can elucidate to amateurs "What's Behind the Dial," and readers are confidently referred to the announcements in this publication of Alan S. Duke Pty. Ltd., which treat of this interesting subject.

MR. HAWORTH

We are pleased to record that Mr. Haworth is back at his desk at Amalgamated Wireless Valve Co. Ltd., Queen-street, fully restored to health after sick leave. This concern forecasts an early importation of a valve to be known as 955, which will reduce the wave length below 5 metres to $\frac{1}{2}$ metre.

International Prefixes

AC—China	LZ—Bulgaria
AC4—Tibet	NX—Greenland
AR—Syria	NY—Canal Zone
CE—Chile	OA—Peru
CM—Cuba	OB—Sarawak
CP—Bolivia	OE—Austria
CR4—Cape Verde	OH—Finland
CR5—Port Guinea	OK—Czechoslovakia
CR6—Angola	OM—Guam
CR7—Mozambique	ON—Belgium
CR8—Port India	OZ—Denmark
CR9—Macao	PA—Netherlands
CR10—Timor	PJ—Curacao
CT1—Portugal	PK—Dutch East Indies
CT2—Azores	PY—Brazil
CT3—Madeira	PZ—Surinam
CX—Uruguay	RY—Lithuania
CZ—Monaco	SM—Sweden
D—Germany	SP—Poland
EA—Spain	ST—Sudan
EA6—Balearic Islands	SU—Egypt
EA8—Canary Islands	SV—Greece
EI—Irish Free State	TA—Turkey
EL—Liberia	TF—Iceland
EP or EQ—Persia	TG—Guatemala
ES—Estonia	TI—Costa Rica
ET—Ethiopia	TS—Saar
F3—Tahiti, Martinique	U—U.S.S.R.
F4—Tunis	V8—Mauritius
F8—France	VE—Canada
F8M—Morocco	VK—Australia
FB8—Reunion Island, Madagascar	VK9—British New Guinea
FF8—Sahara	VO—Newfoundland
FI—Fr. Indo-China	VPI—Ellice Islands, Fiji Islands.
G—Great Britain	VP3—Malta
GI—North Ireland	VP4—British Honduras, Trinidad.
HA—Hungary	VP5—Jamaica
HB—Switzerland	VP6—Barbados
HC—Ecuador	VP7—Bahamas
HH—Hayti	VP9—Bermuda
HI—Dominican Rep.	VQ1—Fanning Island
HJ or HK—Colombian Rep.	VQ2—North Rhodesia
HP—Panama	VQR—Tanganyika
HR—Honduras	VQ4—Kenga
HS—Siam	VQ5—Uganda
HV—Vatican	VR—British Guiana, Mauritius
HZ—Hedjaz	VS1, VS2, VS3—Malaya
I—Italy and Colonies	VS6—Hong Kong
J—Japan	VS7—Ceylon
K4—Porta Rica Virgin Islands	VU—India
K5—Canal Zone	VU1—Bahrein Islands (Persian Gulf)
K6—Hawaii	VU3—Andaman Island
K7—Alaska	W—U.S.A.
KA—Philippine Islands	X—Mexico
LA—Norway	XU—China
LU—Argentina	YA—Afghanistan
LX—Luxemberg	Y1—Iraq
LY—Lithuania	YJ—New Hebrides

QSL Bureau



Cards are on hand at the Victorian Bureau, 23 Landale Street, Box Hill, for the under-mentioned stations, and will be forwarded on receipt of the necessary postage:—

3AT, AY, CK, CL, CM, DQ, ES, ET, EW, FG, GC, GE, GW, GX, GY, JG, JR, JN, JK, KM, KQ, LD, LP, LT, MS, NR, NG, OP, OY, OZ, PW, PZ, QZ, RQ, RS, RT, RW, TY, VJ, VU, WC, WD, WX, WZ, WN, XP, XQ, Y, ZJ, ZK, Messrs. Hecker, Bennett, Carey, Nihill, Nye.

Stations are again reminded that this bureau returns unclaimed all cards not collected within six months from date of receipt.

K6BAZ informs VK3GQ that he (K6BAZ) is "trying to down his non-qsling reputation." May be sincere, may be not, but deeds speak louder than words, and no cards yet to hand. VK has some offenders just as bad as K6BAZ and FM8IH. Play the game, VK's, and qsl if you say you will, and have enough backbone to tell the other chap if you don't intend doing so.

VK must be over the "depression." The number of outward cards exceeded the inward total, during November. This is the first occasion such a happening has occurred since 1931!

The roll of WAC stations in VK should swell considerably if the CX at present accommodating VK's on 14MC sends along his card.

YL—Latvia
YM—Danzig
YN—Nicaragua
YO, YP, YQ or YR—Roumania
YS—Salvador
YT or YU—Jugoslavia
YV—Venezuela
ZA—Albania
ZC1—Transjordan
ZC6—Palestine
ZD—Nigeria
ZE1—Southern Rhodesia
ZK—Cook Islands
ZL—New Zealand
ZM—British Samoa
ZP—Paraguay
ZS, ZT, ZU—Union of South Africa

Unofficial:

CN8—Morocco
FM4—Tunis
FM8—Morocco

Federal Headquarter Notes

By G. B. Ragless, Fed. P.O.

The Federal Executive have decided that the 11th Annual Convention will be held during January 26, 27, 28, 1935, and all Divisions are invited to submit items for the agenda. Divisional Councils are asked to call a special general meeting, and obtain the views of their members, and place them on the agenda. This list of motions must clearly indicate the way the Division placing the item on the agenda wishes action to be taken, or the direction it is prepared to move a motion, and must reach the Federal Secretary by December 25. When Federal Executive have received all the items for discussion from the various States, an agenda will be made up and sent to each Division early in the New Year. The Divisional Councils, on receipt of this agenda, will then discuss all the items and direct their delegate regarding his action. All members of the Institute are asked to take part in the preparation of the agenda, and bring under the notice of their Divisional Council all matters they think should be attended to. The A.R.A. of New South Wales, who have paid per capita fees since they have been affiliated with the Institute, have been invited to take part on the same footing as a Division, and we hope to see a delegate representing them. All Divisional Councils are asked to give the Convention their earnest attention, as many subjects have to be discussed which will have a far-reaching effect on the future of the Institute.

Federal Executive again wish to remind Divisional Councils that the new Membership Certificates are available at a small nominal cost, and would like to suggest that they be issued to all financial members.

Mr. Harry Roberts, VK5MY, recently submitted cards for W.A.C. Certificate, which were found to be in order, and receives the congratulations of all members. The Federal Executive wish to offer the season's greetings to the Councils and members of all Divisions, and hope that 1935 will be another year of progress and success for the Institute in every State.

FISK TROPHY COMPETITION.

INDIVIDUAL PRIZES.

Federal executive have decided to present two prizes for the two best individual scores by competitors in the 6 point relay contest to take place just before Christmas. We still desire each Division to present a prize for the best score in their State, and suggest that this be given to the second highest score in the case of the State having a Federal prize-winner in its ranks. The rules of this contest appeared in the last issue of "Amateur Radio," and as it is the third leg of the competition considerable activity is expected.

All stations are asked to take part in the Contest, and make it better than the previous relay contests held in Australia.

Divisional Notes

A.R.A. MONTHLY MEETING.

By 2HZ.

The usual monthly meeting of the A.R.A. was held at the Y.M.C.A. on November 15.

The new W.I.A. membership Certificate was on show, and it was decided to send one to each member.

The Agenda for the next Federal Convention was discussed, and some suitable points noted for inclusion. 2HZ was elected A.R.A. representative to the next Federal Convention to be held on January 26, 27, and 28.

The new R.S.T. (reporting) system from QST was debated, some supporting, others expressing the opinion that it was an unnecessary change, as the present system covered QRK very well.

2ER concluded the meeting with a talk on his transmitter, and special features, and, judging from the lecture, it certainly has some.

The Vice-President, VK2VG, occupied the chair, as 2UX, the President, is away on business.

NOTES FROM ABROAD.

By X VK2NR.

(It's not Jack's fault that there were no notes last month—the fault is 2YC's, alas!)

I went to the R.S.G.B. Convention, and met all the gang; in fact, I met so many I've got most of the calls mixed up. I remember G2YL, however. Hi. Also ON4AU, VP7AA, G5ML, G2QA, G5HL. Altogether it was a wonderful evening, the only drawback being my inability to draw any of the 40 prizes offered by the various radio firms.

Owing to my future being very indefinite, there is little likelihood of me getting a G call, and most of my Ham work will be done from G2ZQ, whose decency and good fellowship to me have made things very much easier. At present he and G5YH are on holidays in Poland. 2ZQ is to start work with the B.B.C. after holidays, so his Ham future is a bit indefinite.

I tried to get an FBXA from U.S.A., but a landing duty of £20 made me change my mind. HI.

As it is impossible to write to all my Ham friends, I take this opportunity of sending them my 73's.

CENTENARY CONTEST ORGANISATION.

A hearty vote of thanks is due to those VK's responsible for the origin and ground work done in our recent DX contest. All we can say, as a form of thanks and sign of our approval of their efforts, is "Please repeat the dose next year."

A.R.A. WEEK-END CAMP.

By VK2HZ.

On November 10 and 11 the A.R.A. held its first week-end camp at Mona Vale, twenty miles out of Sydney. The event was a success, some 30 being present at the peak.

Bob Power, 2DR, 2YA, 4OB, and 2HZ were the advance party, and went down on Friday, spending Saturday morning installing the transmitter in the local garage so as to utilise A.C. for the supply. This consisted of a 47 CO on 40 mx and 46 PA. The transmitter was soon in operation, and all States excepting VK6 were QSOed.

Throughout the day the campers drifted down, and later 2KA and 2VG arrived with a portable Hartley, which was installed in the camp and operated from "B" Batt.

Saturday afternoon was spent by most playing cricket, or playing about with radio gear. 2DR brought a portable 80 mx. loop receiver, which has a nice range. This could also be used as a transmitter.

On Saturday evening some of the gang attended the local dance, while others just made a row. Practically everybody was in bed by midnight, and by 12.30 a.m. everyone was up again, the tents losing elevation three times during that time—from then on it was more or less an open go, every "Ham" for himself. 4 a.m. saw the end of any attempts to sleep, and practically everyone turned out, either for a swim or for cricket.

Up till 10 a.m. a few more visitors arrived, including 2HI, 2PV, 2VQ, 2SS, Harry Whyte-meach, 2LZ, 2YC, 2BJ, 2TX, and Miss Baker, 2FF, and others.

All the catering arrangements were supplied in the hall by the local refreshment rooms.

In the afternoon 2VG-2KA transmitter was located at Narrabeen, and the camp station XVK2WI was worked. Amongst the high lights were Andy, 2AX birth to a tick—2DR's swollen nose, and consequently his treatise on wicket-keeping, also his mania for tent demolishing; 2XT's intermittent snoring and laughing; 2EL's unconscious look the morning after; 2YA and 2BS's marked absence on Saturday night from the camp; 4OB and Bob Power's sleep at 5 a.m. on Sunday; Bill Clives and 2HZ's jaunt to Narrabeen for sleep; AND amongst the startling discoveries were that—Motor-bike spark plugs don't need 1/8 in. gap; that tents won't stay up without ropes; and, finally, that camping is not all it is cracked up to be with 2DR, 2EL, and others about.

Amongst those present were: 4OB, Bob Power, 2YA, 2DR, Bill Clive, Harry Whyte-meach, 2VQ, 2YC, 2SS, 2HI, 2KA, 2PV, 2VG, 2BP, 2TX, 2XT (all the way from Newcastle), 2AX, 2BS, 2EL, 2BJ, 2LZ, 2HZ, 2DA and Mrs. 2DA, 2DR second op., 2JH, 2AG, 2ZV, and Ron Hands, and others.

NORTH SHORE ZONE.

ZO—VK2DR.

Well, here we are again! Another month gone by, DX contest and A.R.A. camp over, and things getting back to normal again. Many and varied were the fish-yarns in circulation at the A.R.A. general meeting last night re doings in the test. Everyone appears to have had a good time. Pity there's not enough 852's to go round, though! Condx

during the month have been good on 40 mx and NSG on 80. Europeans are easily QSOed on 40, especially in the early a.m. Sa, who didn't work VQ4CRL during the contest? He certainly pumped an fb sig. across, and was kept very busy with eager VK's. QRN is the trub. up on 80, of course. When the QRN eased up on one or two nights, condx were FB. ZL's could be worked on phone easily. So much for condx.

Now for the local gossip. Young Dave, 2AE, managed to scrape in a South American, and made his WAC during the contest. FB OM. What if 'e doesn't QSL, Dave? 2AE was very consistent in the test, his CQ's being heard at some unearthly hours of the night. 2BJ rolled along to the A.R.A. camp. Keith finds the 46's FB. Don't we all? 2HL has been active. Haven't heard from 2HY since the contest. Roy's probably still asleep! (Hi.) 2HZ has big bottle in final, and has been keeping me company with the early morn. DX. Jack, of 2JH, was also present at the A.R.A. camp, and shook no mean festive toe at the local dance on the Saturday night. 2KA, 2EL, and 2VG brought an fb lil xmitter to camp, and did some good work with a watt or so, and say, can't Eric (2EL) climb trees! 2NP was the first to contact the A.R.A. field xmitter, and chewed the rag for some time. 2WW hooked with 2KA's outfit. Ian (2XC) couldn't get along to the camp owing to studies. We missed you, OM.

Now, amongst the Manly chappies: 2BS has been getting amongst the European DX. G, GA, etc., falling for his carefully baited CQ's. 2AX is in the throes of rebuilding. Andy's new rig will have an input of about 25 watts. Heard that one before, OM, but I didn't hear the one about the Three Bears! (Hi.) 2QK has also been amongst the DX with his 46's in pp. K5 and good old VQ4CRL were included in the bag. Hear that 2QF is QYL but active. What a man! What's your secret, George? 2QF has no trouble in obtaining QSO's without that magic symbol CQ. Pity a few more of us don't do the same. 2WQ is rebuilding through heavy QRM from work and YL. Bob can handle the situation, though. 2FF is a new ham in Dee-Why, and is using 46's. Let's hear from you, Frank. 2CE at Harbord is QRL work. 2DA put all available time into the contest and got amongst the DX without any trouble. Harry and Mrs. 2DA visited us each day at the camp.

Well, here's the Mosman notes from 2XC again: The event of the year is over—our own DX contest has been and gone, and what a success! Main impression was one of DX galore, and QRM! Seemed as if every ham in Australia was on, but the number of VK's with T9 sigs. reflects great credit on the gang, and, judging by some of the comments from DX stations, we have established an excellent reputation abroad. Anyway, who doesn't want another such contest? It was such great fun that I sincerely hope it becomes an annual event. Here's hoping. The most successful North Shore station was Con (2LZ), who knocked up an excellent score by working Europeans hand over fist.

2DA concentrated more on the Yanks on 7 m.c., and went through them like . . . like anything!

2HZ's business kept him from getting on much during the contest, but he made up for it in between the week-ends. He has now settled down to a permanent transmitter, which uses a large bottle in the final and pushes a hefty sig over to Europe in the mornings on 7 m.c. The Mosman gang have been very quiet this month—only 2XC and

2FM being on at infrequent intervals during the tests.

2HI is still QRL building a super, and is rarely heard on the air.

2FM has established a reputation for himself by being able to burn out a torch bulb in his inside receiving antenna when the transmitter is on, absorption plus! 2PV and 2XC are both QRL, uni. exams, but hope to make up for lost time during vacation. That's the lot from Mosman this month. Thanks vy Ian OM., you're a clobber. Well, there's no doubt the A.R.A. camp was fb, despite the fact that numbers present were not up to expectations. We all learnt that Bill (2HZ) "doesn't muck about and never did," and that the ground isn't so jolly soft to lie on as it was when we were in the Boy Scouts! Eric (2EL) is no new hand at the art of collapsing tents, and Rex (2YA) very nearly had the unique experience of taking off in his newly-acquired car with a strong rope anchoring it to ground (hi). News has filtered through that there's been some dirty doings in VK5. Ask 5FM about the fuse and the bag of flour containing a star bomb! (Hi.) Well, that's about the lot this month, chaps—not much, I'll admit. Too bad!

LAKEMBA RADIO CLUB NOTES.

(Affiliated with A.R.A., N.S.W.)

The meetings of the Club are held every second Tuesday at the clubrooms, 79 Park Street, Canterbury. During the past few months lectures of general interest have been given: "Aeronautics," by 2XZ; "Mining in Broken Hill," by 2EH; and "Radio in North Australia," by F. Carey (ex VJB), proved of great interest.

The transmitting members of the Club are as follows:—2LR, 2AT, 2CY, 2DL, 2ED, 2EH, 2EV, 2FD, 2GZ, 2HE, 2IC, 2JT, 2LS, 2NJ, 2OV, 2OD, 2PX, 2QP, 2QX, 2SK, 2VY, 2WF, 2XD, 2XM, 2XW, 2XZ, and F. Carey (ex VJB, North Australia).

The club's official paper, "Lakemba Review," is progressing beyond expectations. This paper is on sale for members each club night, and every issue is unanimously subscribed to.

MEMBERS' DOINGS.

2PX has an FB location up in the Banks-town Bush. Works most of his DX in the early morns. 2SK just completed a new rig. Excellent piece of work. Perks FB. 2OD, now WAC. Tom works plenty of DX with his MOPA and semi-vertical aerial fed at the high end. 2XW—not on much now. QRL with his new motor bike. 2EV overcomes the local QRM with his S.S. Super. 2FD has built his rig on plate glass. Looks and perks FB. Bill Picknell at present up at Inverell. Bill still goes crook if anybody mentions field days. 2XZ about to rebuild and should have an FB rig by the time these notes appear. Dick is chasing Africa for WAC.

ZONE 7 NOTES

ZO—VK2FI.

Old man static has been running wild of late, consequently 80 mx is practically deserted. 2JQ, of Moruya, has not been on the air much for some time, but expects to begin chasing DX again soon with a new 50-foot mast. Has been experimenting with battery broadcast superhets, and praises the 1A6 tube. 2PN says he is active, but I can't hear him. 2GT has been QYL so long that he has forgotten how a key works. S'prised at you, George! Rumor has it that old Harry, of 2YI, might be back at Giralral with 2FI again soon. 2FI playing with a new engine, and burning-out generators by the score. Has a new receiver using 78, 77, and 37 tubes, which

perks very nicely. Owing to harvesting operations, too, QRL to collect any further dope this month, but hope to do better next time.

ZONE 8 NOTES.

A.R.A. (N.S.W.)

ZO-VK2OJ.

Now that the contest is over, there is a noticeable absence of the more active stations on the air. Suppose they are getting some of the shut-eye which they missed. BAD luck came 3EG's way, as a few days before the final week-end his aerial was caught by lightning and completely ruined his transmitter. Coils were melted together, valves shattered—the whole outfit in a mess. That's what Ivan found when he returned from a few days at Corryong. It was tough luck; but rather lucky that you were not in the shack when it happened. OM. Now rebuilding and methinks a pair of DE T1's (or what?) in PP, will be working overtime very soon.

Conditions for the first two contest week-ends were very good. During the third, hours were spent trying to hear VK's through QRN. Improved for the last; but has been one mass of QRN ever since. 3GQ and 2XU seemed to monopolise DX, and their scores must be very near, if not winners. Good luck, OM's. 2QE now going MOPA. A good steady Zone, HR, all MOPA. HI. During the coming Inter-Zone Relay Zone 8 will most likely be represented by 2QE and 2OJ, if not too QRL. 2YI cured that RAC by replacing the 45 by a 210 in the oscillator. Note now T9.

ZONE 10a (MAROUBRA).

A.R.A. (N.S.W.)

ZO-VK2XV.

The outstanding event of the month, of course, has been the Tests—and what a time we had! DX galore, and plenty for everybody.

Conditions were very fb for every week-end on one of the bands, at least. 2XV was the only station active right through the tests out this way, although 2WJ and 2XK started up on the last week-end. Several new countries were worked, and we are keenly anticipating a test of a similar nature next year. What say, everybody else? 2FQ hasn't been very active this month; been very busy with BCL sets. What about the chap that wouldn't part up with the 16/- for the 247, Jack? Hi.

2WJ still pumps out good phone on 14 m.c. and holds council with 2XF, 2XV, and 2FQ practically every night of the week. It's a pity more Hams can't get down to the higher frequencies; it's the berries. The very uncertainty of it is tantalising. 2XV and 2FQ had an R8 QSO both ends, with K6BAZ at about 2030 one night, and about a week later 2WJ and 2XV were QSO CX1C at about 2000 hours. It's really fb down there. 2XK with his semi-QRP rig seems to get out just as well as his high power rig neighbors, and works plenty of DX.

VK2SA has been on regularly lately, staging a come-back together with 2CD, and 2NO has been heard down there testing. The latest news we hear is that 2XU has decided against coming to Maroubra to camp. Hi.

If anybody round Eastern Suburbs way would like to give me some notes, I will be pleased to include them in this short news gathering. Please get in touch with 2XV, either on 14 m.c. or 7 m.c.

14 m.c. has been remarkable during the past month. Europeans such as T, F, PA, D, OK, SM, VU, OH, ON, together with K6, CX, AC, J, PK, VS, OM, W, etc., all being worked this month. ZSIH is also appearing on Sunday afternoons approximately 1500 SMT.

KEY SECTION NOTES.

ZO-VK3PX.

The monthly meeting of the Key Section was held in the W.I.A. rooms in Law Court Chambers, on Wednesday, November 7. Due no doubt to the wet weather, and possibly to some extent to the arduous round of Convention activities during the previous week, the attendance was rather poor. After QSL cards had been distributed by VK3RJ, general business was dealt with. Owing to the unavoidable absence of several members of the debating teams, it was decided to postpone the debate until the next meeting. At the conclusion of general business, Mr. Max Howden (VK3BQ) gave a talk on some experiments he had made recently with Tritet crystal oscillators. This was most interesting, and it was a pity that it could not have been given at a better attended meeting. Now that the DX contest is over, activity on all hands is rather limited, but a fair number of the boys appear to be making preparations for the ten-meter contest. Amongst these are VK3JJ and VK3JO. The latter has now to put up with another Ham in the shack, as VK7OJ has come back after 19 months in Tasmania. VK3OX is also rebuilding gear for the 28MC contest, and has at last overcome the key clicks on 40. VK3DP is trying early morning DX, and hopes to work some of those rare Africans to WAC. VK3FY is testing the oscillator of his new MOPA rig, and hopes to have it going soon. VK3TY wants to know if ZU5BJ QSL's, and would also like BCL reports on his phone and QSO's on 28MC and 7MC on Sundays. VK3CS is on 7MC with a 210 in a Hartley. VK3KC would like reports from anyone hearing his portable rig. QSO's are hard to get with .1 of a watt. VK3PX had some bad luck recently, when about a fiver's worth of gear was stolen from his shack. As this included the RF part of the transmitter, he was not able to rebuild in time for the contest, but he will be on again in a week or two if all goes well.

History was made at a recent camp of the Signallers of the Victorian Scottish Regiment at Hall's Gap, Gramplains, under the command of Capt. R. Dunt, when contact was made between 3RH under an Air Force Wireless Telegraph Reserve call and 3WQ under a Military call of the V.S.R., over an airline distance of about 45 miles.

This marks the first contact between the R.A.A.F.W.R. and the Army.

The set used by 3RH was his usual X-tal rig, and the one by 3WQ was an 89 in an electron coupled circuit built by 3WQ, and had an input of .8 of a watt when R7-R3 (QSB) was obtained under bad screening from hills, etc.; the wave-lengths used were 69.95 meters and 73.17 meters.

The signal was, strange to say, rock steady, although the transmitter was subject to vibration during sending, so this speaks well for the electron coupled circuit.

3WQ wishes to thank 3RH on behalf of the Signallers, for all the very FB assistance which he gave them, and also for the loan of the motor generator which was used in a later test when R7-R5 was obtained.

We also wish to thank 3WG for the loan of a receiver, which we understand caused him the loss of a few hours' beauty sleep, to build up, and we can assure him that it was "the goods."

As we go to press, the following points have been scored in the International 28 m.c. Contest:—

VK4BB, 32; VK3HK, 10; VK3JJ, 10; VK2LZ, 6; VK2HY, 6.

MALLEE NOTES.

By VK3WE.

Doings of the Mallee gang over past few weeks have been rather spasmodic. Old man QRN has curtailed activities on all bands, and particularly on 8500 k.c. Work on this band after sunset has been well nigh impossible on most nights, though a few die-hards, with little regard for their ear-drums, seem to keep going. In the early evenings ZL's and W's are still heard. The "chain" gang (3's CE, WN, ZK, EP, PY, PW, and WE) still continue Sunday morning and afternoon schedules, but sigs. and quality have deteriorated, mainly due to conditions, which vary almost from "over" to "over." Aside from entertaining (?), the B.C.L.'s on the publicity band 3CH and 8LH have confined their activities to amplifiers and public address systems. They ran the P.A. system at Donald for the visit of the Duke of Gloucester, and Alf was tickled to bits when H.R.H. spoke over his mike. It is noticeable that although 3CH could (or would) not be convinced that his condenser mike was inferior to a X-tal mike, he has now installed one of the latter. The three Birchchip stations, 3's LH, CH, and WE, now possess X-tal mikes. Owing to previously mentioned QRN, and local QRM, 3WE has only rolled up about 40 QSO's for the month. Outstanding in QRP sigs. worked was 2TM, who uses 238CO, 233PA Telefunken modulation, with 230 and 180 volts "B" batts. QSR8 here on phone, too. 5QR, the croweater QRP merchant, came to light again, this time from Jabrek—don't know where that is, but Reg says quite a few miles from a pub. Other fb sigs. here include 5LC, 2XD, 7CK (Poley must have plenty of water for the wheel now), 5FM, 2HU, 3PY, between intervals of X-tal grinding, curses local power supply, but is now building an auto-transformer to cut out varying local voltage trouble. 3ZL, the Ballarat Telefunken expert, has joined the ranks of the Benedicts. Y.F. already on the mike—get 'em young (or early) and train 'em. I should have started earlier. HI. Nothing much heard on 40 or 20 here, though overseas and local B.C. S.W. stations coming in well.

SHORT WAVE NOTES.

ZO—VK3XJ.

Considerable interest is being taken by the German broadcasting authorities in the graphs compiled from observations on the German short wave stations, made by members of this group during 1933.

The group is making further observations on the special Australian transmissions which commence on December 1, 1934, daily from 6.45 p.m. to 10 p.m. Eastern Aust. standard time, through DJB on 19.73 m. and DJD on 25.51 m.

Any reader who is interested in the compilation of these graphs is requested to communicate with the Secretary, VK3XJ, Newstead Street, Maribyrnong, who will be pleased to forward report sheets and any information they desire.

Our last meeting was well attended, and Mr. Ron Higginbotham delivered an interesting paper on "Whistles in Superheterodynes."

On December 13 this group is undertaking frequency measurements on overseas broadcasting stations, which should prove valuable to members generally.

A syllabus of lectures is being drawn up and will be published with the January notes. Gang, have your lectures ready in time.

WESTERN DISTRICT NOTES.

3OW-3HG.

With the big contest over, DX is not quite so plentiful now, although a few stations are coming through on 20 mx.

The contest proved that conditions are quite suitable for DX, if only the stations would get on the job more.

3PG put up a fine performance in working 9 countries with 2 watts.

A couple of South Americans—CX and CE—are coming through on 20 mx and working VK, but are seldom audible here! 3HG was fortunate enough to contact CXICG the first time he heard him.

3JE in Coleraine has built up a 3-stage rig, using tri-tet C.O., and gets half amp. in feeders on 20 mx, using the 230 volt D.C. mains. Bill doesn't like the extra pure T9 sig. given by the D.C. (hi!), and is designing a transformer to enable him to use a 24 volt 25 cycle converter to power his transmitter. Guess this will give the required ripple to the sig.

News seems scarce this month, so 73 boys. Please send along any news you have.

VK4 (QUEENSLAND DIVISION).

By VK4RY.

The monthly meeting of the Wireless Institute (Queensland Division) was held at headquarters, Heindorf House, Queen Street, Brisbane, on Friday, November 2, before a fair attendance of members.

Mr. P. Kelly reported to members the activities of the T.D. Section. Quite a lot of good work has been done by this section, and at present the construction of a 56 m.c. transmitter and receiver is well under way.

The student classes continue to receive good support, and intending students wishing to join up should get in touch with the Secretary, Box 1624V, G.P.O., Brisbane.

Conditions during the recent Centenary Test were nothing wonderful in VIB; however, all the boys were out to gain as many points as possible, and each week-end one could hear plenty of CQ DX "cent" calls.

4GK, 4US, 4UU, 4EI—all members of this Division—seemed to be doing well, and no doubt knocked up some decent scores. 4WT has been QRL lately, building a new power transformer; also turning out some fb. Bug keys. Bill also intends making something out of the box in the way of X-tal holders; no doubt more will be heard later. 4GU receiving some good reports on his phone from ZL; also has now one of the finest shacks to be seen up this way. 4TS has now become interested in a motor boat; darsay some portable gear will find its way on board shortly. 4JB recently landed two South Americans (LU and CX) on 14 m.c., but states conditions very patchy on this band. Oek is still looking for South Africa for his W.B.E., W.A.C. 4UK, of Toowoomba, is now residing in VIB, having been transferred to this part. Hope you find the DX as good here OM.

4UZ, a new country member, has just completed his Xtal rig, which comprises 47CO, 46 Dub, pair 46's in parallel as p.a., and reports indicate that all is well. 4JF and 4ZX have not been heard so much lately. Wot's the trouble, boys? 4WD still continue to put out a hefty sig., and is now waiting for an African to complete his W.A.C. 4JM has been trying out his new rig—59 electron-coupled osc., 46 dub, and pair 46 p.p. final. Jim is not satisfied with his QRI and a X-tal has now been ordered.

4MC is still on QRP, but will soon be heard QRO on his new X-tal rig, which is nearing completion.

4AW finds that R.A.A.F. reserve skeds keep him busy, also his Morris car, which by the way seems to be working overtime lately.

4HB and 4HL not very active of late.

A letter received recently from W6AMC—Norman Isherwood, Oakland, Calif. He wishes me to inform all Hams visiting U.S.A. to be sure and call on him. He has plenty of room at his QRA, and a hearty welcome awaits all.

Well, boys, all this time. My best wishes for a Merry Christmas and a Prosperous New Year.

SOUTH AUSTRALIA (VK5).

By ERIC HALLIDAY.

With the rush of the now famous Centenary Contest over, things in South Australia are getting back to normal again. Several of the Hams have decided to take a holiday from radio until the New Year. Evidently the strain of the contest proved too great for them. Hi. (Don't forget the Fisk Trophy, OM's—Ed.) Conditions are now getting back to ordinary midsummer dx. 80 m. is slowly dying out, and on 40 m. there is quite a bit doing at times. Several of the local Hams have been hearing a South American, who has been on fairly regularly on the 40 m. band. As soon as he is heard, one can hear all the local chaps calling him for all they are worth. Up to date 5GW has been the only one to work him.

5MY worked his second South American during the contest. Fb on. 5RF still entertains the BCL's on 200 m. Bob is building up a new rig for 40 m. in a frame. 5SU is back from a holiday in VIM. Brought back some big rectifiers under his arm, too.

5LJ is still playing around with radio. By the way OM, you want to go easy with that silverfrost another time. 5RT has presented his single sig super to the Technical Development Section. Your gift will most certainly be appreciated, OM.

5FM is rebuilding his rig. Hopes to make a bit of noise directly with a couple of big tubes. 5MD burnt out his power tranny the other day. Bad luck, Doc! Still makes music on the 200 m. bond. 5NR and 5BY also take their shares in entertaining the BCL's. 5WR still works DX occasionally.

5WP is going to take a holiday from DX hunting. Bill put up a swell performance in the contest, but does not expect to be on the air now until the New Year. Bill says that being a secretary takes quite a lot of time, and does not leave much for DX. Help him, boys, by paying up your subs.

6YK has just put new rectifiers in his perk. 5LD has just finished rebuilding his 3-stage c.c. rig. How is the power supply getting on in the "rabbit hutch." OM? 5LG is still in VK5 with the YL's. Says he may be home about Christmas.

5AX, Alf, Traeger, of the Australian Inland Mission, has promised to give the members a lecture early in the New Year. 5RF sat for his "B" class the other day. What luck, OM? You have our good wishes.

5SL is interested in radio again, and has joined the Institute. Welcome, OM! Has also applied for a 200 m. permit. 5PB, of Naracoorte, has also joined the Institute. Nothing has been heard of 5FB and 5PK since they returned from their trip. Let's hear how you got on, OM's.

5WI is on the air quite a bit now, giving frequency checks. The perk is getting out well, too. Recently got a R9 report from VK2 on phone. The TDS has been working quite hard recently. The other Saturday afternoon a stunt was arranged in conjunction with 5CL-CK, but it had to be cancelled because of an interstate relay. It was intended to

put a s.w. transmitter on one of the yachts at the opening of the Royal Yacht Squadron's season, broadcast a description of proceedings ashore, and then rebroadcast it through the National Stations. It is now proposed to take a perk up in an aeroplane over the city, and have the National Stations rebroadcast the proceedings from the plane.

The elementary lectures have again proved a great success. Harry Wheeler (5HW) is making an excellent job of the lectures, and it is not at all uncommon to see several of the chaps with their tickets along listening to him.

The Federal Executive are to be congratulated on having issued membership certificates to all financial members. This was a thing that the Institute had been lacking for years.

All eyes are now being turned towards the Convention to be held in VK7 on January 26, 28, and 29. It is expected that 5WP will represent VK5. 5GR is going over, too, and 5MD and 5RD are also thinking of making the trip. It looks as if there will be a real party from VK5.

The November general meeting was held on the 14th. Professor Kerr Grant, of the University of Adelaide, was to have given a lecture. Unfortunately, this had to be postponed for a week. There was a record crowd at the University the following week for the lecture. Professor Kerr Grant gave one of the most interesting and instructive lectures members have heard. The subject was "The Piezo-Electric Effect," and dealt with oscillating X-tals, with special reference to their luminous effects.

Special thanks are due to the Professor for the time he spent in preparing the lecture. Some of his assistants at the 'Varsity had been working for over two months preparing the apparatus used in the demonstrations.

As these are the last notes for 1934, I would like to take this opportunity, on behalf of all the Hams in VK5, to extend to our fellow-amateurs all over Australia the Season's Greetings. May amateur radio bind us together still more closely in 1935, in that feeling of good-fellowship that exists among all Hams.

73's, a Merry Christmas, and a Happy New Year from VK5.

VK6 NOTES BY 6CP.

At the monthly meeting for October, the best attendance we have had for some time resulted in a large amount of work being put in hand.

Cliff. Brown was responsible for the forming of a Social Committee, and, as leader, is doing great things. Already an outing has been arranged for November 18. A mixed party will enjoy a run in the hills looking for a hidden 10 mx. xmitter.

The Council recommended the sale of all surplus gear, and tenders are being called for same.

5RL reported that 6WI was almost completed, and the delay was caused through losing his mate, 6RX, who had gone to VK9 as operator at a big noise at Port Moresby.

6CP agreed to continue transmission of Morse practice, the new sked being 11 a.m. Sundays.

At the conclusion of the meeting, 6SA spoke, and lectured on 10 mx. and 5 mx. rigs, much good being gathered by all concerned.

CALLS HEARD BY ZL 410.

(J. Lunn, 67 Fox Street, Dunedin.)

Heard on 14MC, October 27 and 28.—VK2XU, 2DA, 2DZ, 2DL, 2HF, 2LZ, 2XV, 3BQ, 3HK, 3HT, 3MR, 3JQ, 3KR, 3JJ, 3HI, 4EI, 4BB, 5WJ, 6SA, 2WJ, 2IC.

WHAT VK6 HAMS ARE DOING!

The event of the year, the Centenary Test, produced only five starters, at least that was all I heard through the VK2 and 3 QRM. "Just fancy trying to read an R3 Yank through 3MB!"

Honors of VK6 will go to 6SA, with about 16,000. A close go for second will be MN and FM, while CP will undoubtedly run fourth, with KB last. Val. struck a heap of trouble, and was only once able to get through a QSO during the whole contest.

CP decided at the last minute to go QRO? 25 watts. CP's impressions will be the subject of a special article and station description, which I hope "Amateur Radio" will find space for. Anyhow, we had a jolly good time using up the units.

Not much activity on the bands at present, but things are popping up a wee bit.

6SA is keeping watch on 10 mx. on Sunday mornings, and CP and MN putting all their junk together.

KB has had CX with him, chasing RF bugs in his xtal job, and has now cleaned up to the final PA.

Heard now and then are 6DH, KO, FO, RT, FM, HD, and, of course, MN. Most others are silent, while LK is supposed to be pounding up at Northam, but, so far, have never heard his sigs.

RL on 6WI, but not yet heard.

The students are all swotting for the January exam., and planning out their first xmitter.

VK3s and 2s are coming in with a thump in the early evenings on 40, and would just like to know why 3JL started to retune his rig after answering a VK6 CQ. The 6, in fact, went back, gave 3JL a hefty TG. RMAX report only to hear him messing about when the 6 went over. A wait of 10 minutes, during which time the carrier was still on, and then JL starts up CQ. DX. "Funny, but the 6 did not laugh!" Also, Easterners, your sigs. come through here on Sunday mornings at 9 a.m. local time, so keep a look out for VK6 for daylight QSO on 40.

6BN will surprise some day when he is heard on the ether.

CX doing his stuff, but Secretarial duties keep him busy.

Now, boys, let's hear you. Also your dope, and any item of interest.

VK7 (TASMANIAN) NOTES BY 7PA.

The meeting for November was held a week later than usual, owing to the Hon. Secretary being at the Centenary Convention, and to allow time for his return with first-hand information as to the doings in V.I.M. This meeting took place in the club-rooms on Tuesday night, November 13, with a fair attendance. After the general business was dispensed with, instead of a lecture, the Secretary gave a talk on his trip and business arising out of same, and we understand that he was given a fine time, too.

A letter was read at the meeting to the effect that the 1935 convention is to be held in Hobart, and we hope to be able to put on a show that will be in keeping with the Melbourne one of this November.

Every effort will be made to accommodate the visitors, and anyone intending to make the trip would be well advised to get their arrangements in hand early, as the gang here is only small. The date fixed for this event is about January 26, 27, and 28, 1935, and a comprehensive programme, with field day, etc., will be arranged.

Work on the bands is not very extensive at the moment, 40 being about the only one used, atmospherics have been bad on most occasions, and very few DX'ers logged.

7BJ was heard working a G on early a.m. of Friday, 16th.

7JH broke the ice with a KA1 recently. 7AR is to be heard with clean crystal signal.

7CW got his 40 meter rig going again, recently, but hasn't been heard at this QRA yet.

7KV has got an 800 for his final, and is having great fun, with plenty of T1 report.

7PA by some means contacted a W a few days ago, and, after working a second, the same night, hasn't raised one since. His rig seems to be perking O.K. at last.

On 200 meter 'phone, our usual Sunday crew do their stuff, and some good programmes go over at times. 7CW has been rebuilding his rig into an elaborate 'rack and panel assembly, and is also following with a resistance-coupled modulation system, I hear.

NORTHERN NOTES (VK7).

By VK7LZ and VK7CP.

The big event this month in the North is the field day to be held on November 25, and as it is the first held for many years it is being looked forward to very keenly, both by the Northern gang and by several BCL's that are taking part. It is proposed to use VK7JW's transmitter, and it is expected that about four car-loads of searchers will be on the look-out for the signals.

We welcome a newcomer to our ranks this month, in Mr. Fisher. Although he has only recently sat for his exam., Mr. Fisher, in company with VK7XL, was responsible for the construction of VK7DR. We hope to hear VK7DR on the air again shortly.

VK7AM hopes to come on the air soon with an E.C. osc. 46 doubler, and 210's in push-pull.

VK7BK still entertains BCL's on 200 m.; has 620 records in his shack. Say's he can't vary his programme enough. Hi.

VK7CP building phone transmitter and trying suppressor grid modulation. The rig is portable, and CP has made a very neat job of it.

VK7JW experimenting with aerials; at present using a Collins system. Has turned his car into a portable radio station.

VK7XL, a newcomer in VK7, is working on 80 m. and 40 m., using a Hartley rig with a 2A3, 25 watts input.

VK7CK and VK7RC still do their share of CW work. By the way, Ron, how did you enjoy the Convention?

VK7LZ just finished an 80 m. phone rig. Has hopes of going on 200 m. shortly. Still does RAAFWR work on 80 m. with CW.

As the Northern Section covers a large district, we would be glad if members would send in reports on their activities. Very little is heard of the North-West Section, and it would help considerably if all were to send their notes along early to 7LZ or 7CP.

May I ask every member in the North to help us sell more copies of this little magazine? Show it to your radio friends, and then get them to send along a twelve months' sub. You know the cost, and it's worth it.

All district notes should be in the Magazine Secretary's hands on or before the 18th of the month.

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R.A.A.F. Wireless Reserve Notes

 <p>VMB</p> <p>Total No. of Messages 74</p> <p>Average per Station 18.5</p>	 <p>VMB 1</p> <p>Total No. of Messages 43</p> <p>Average per Station 14</p>	 <p>2B3</p> <p>Total No. of Messages 31</p>
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FEDERAL NOTES BY THE C.O

Activity in all districts was at a minimum during October and carried itself into November as members were recuperating from the effects of the Centenary Contest and Conventions, etc. It was very fortunate that H.Q. had the pleasure of a visit from 5Z1 and 7Z1 during that period. Now that things look like settling down again we may look forward and make plans for the coming new year. There is little of interest to report in the Federal notes this month so we can go ahead with the District notes.

SECOND DISTRICT NOTES BY 2Z3 D/D/C

The report this month must necessarily look sick owing to many reasons. 2Z1 is waiting sanction to pass the command over to 2Z3 and as soon as this is done it is hoped that training will pick up once again. However, with the fine weather coming on it will be hard to keep members up to the mark with watches! Why not equip ourselves with complete portables and conduct watches whether we be in the hills or surf? Traffic totals: 2A2 27, 2A4 2, 2A5 14, 2B3 31.

FOURTH DISTRICT NOTES BY 4Z1

Watches are being conducted at present on 7317 kcs at 0900 hours each Sunday. This frequency, at the present moment, is proving very satisfactory for general working with most stations in both sections. A slight increase in activity and traffic handled is noted over last month and it appears as though the score will be high

each month as 4Z2 is active in connection with watches once again. 4B2 has been off during the 7317 kcs work owing to it clashing with his week end activities. 4B5 has shifted to Brisbane but as yet no permanent address, so he is not active as far as Reserve work goes. 4B3 recently paid a visit to 4B1 and spent some happy time chatting radio and Reserve. 4B1 anticipates having a transfer to N.W. Queensland after Xmas and is looking around for a motor driven power supply. 4A1 resumed watches recently as the morning seems to fit in better with other work. 4A2 is still off owing to no power supply.

Traffic totals: VMD 45, VMD1 17, VMD2 11, 4Z1 15, 4B1 7, 4A1 7, 4A4 5, 4B3 4, 4Z2 2, 4A6 1.

FIFTH DISTRICT NOTES BY 5Z1

Reserve schedules have been suspended lately due partly to inactivity and partly to the Victorian Centenary DX Contest. 5Z1 visited VMC during the Centenary Convention month and met 1A1, 3Z1 and and 7Z1 and quite a number of the VK3 hams and Reserve members. A visit was made to Laverton and it seemed quite marvellous the way 1A1 and 3Z1 took afternoons off ad lib! Christmas Greetings to all reserve members from VME and best wishes for the future of the reserve.

SIXTH DISTRICT NOTES BY 6Z1

The activities of the last two months have not been too brilliant but the announcement of an unofficial visit of 1A1 in a few months time will add the necessary incentive to bring things

up to scratch in the near future. 6Z1 had to discontinue the mid week watch on the 4000 kcs band owing to a punk BC set a few doors away, which has resulted in disorganisation of contact with certain distant members. 6A3 has been up to his eyes in work lately and radio had to take a back seat for a few weeks. 6Z2 has been working so hard, too, that he cannot manage to get up for the 0900 hour watch on Sundays! 6A1 and 6A5 are very active. 6A4 threatened to come on the air and make his debut to the ether. 6A2 sits for 1st grade commercial ticket in a few days time. Once that is over we will have him back on watch.

SEVENTH DISTRICT NOTES BY 7A1

Paucity of membership engenders difficulty in compiling any records of activities in this District. The membership at this time is but four, of whom one, 7Z1 is in Melbourne, whence we hope he will return with bigger and better plans for furtherance of Reserve work. For the remaining three, message totals are too low to record, but good work has been done in overcoming some of the intricacies of the second part of the training manual, which, one hears, causes 7A2 and 7A3 no little worry at times.

SPECIAL NOTE TO RESERVISTS

Notes of activities reaching this headquarters later than the 18th of the month will NOT be published in future.

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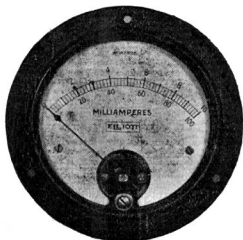
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